

# ANNUAL REPORT FOR 2007



**Myrick Pond Mitigation Site  
Richmond County  
TIP No. R-2231**



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## **SUMMARY**

The following report summarizes the monitoring activities that have occurred in 2007 at the Myrick Pond Mitigation Site. The 2007 monitoring year represents the first year of hydrologic and vegetation monitoring following construction. The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the site is deemed successful. The site was constructed to compensate for impacts associated with the US 220 Ellerbe Bypass in Richmond and Montgomery Counties, specifically in the Lumber River Basin (03040203) Hydrologic Unit Code (HUC).

In February 2007, groundwater monitoring gauges were installed to monitor hydrology on the site. Five groundwater gauges and one rain gauge were positioned on the restoration site.

Hydrologic success criteria are based on the approved mitigation plan and require that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall. According to the Drought Management Advisory Council for North Carolina, Richmond County experienced exceptional drought conditions for 2007.

The 2007 year represents the first year of hydrologic monitoring for the Myrick Pond Mitigation Site. All five groundwater restoration gauges recorded jurisdictional hydrology above the required 12.5% of the growing season and met the success criteria for 2007.

There were three vegetation monitoring plots established throughout the 2.45-acre planting area. The 2007 vegetation monitoring of the site revealed an average tree density of 515 trees per acre, which is well above the minimum success criteria of 320 trees per acre.

Based on the results from the first year of monitoring, NCDOT will continue to monitor vegetation and hydrology at the Myrick Pond Mitigation Site.

## **1.0 INTRODUCTION**

### **1.1 Project Description**

The Myrick Pond Mitigation Site serves as mitigation for TIP No. R-2231, the US 220 Ellerbe Bypass in Richmond and Montgomery Counties (Figure 1). The 13.6-acre site is located in Richmond County, approximately 42 miles south of the city of Asheboro. The site includes 9.40 acres of open water, 2.45 acres of emergent and riparian wetlands, 1.90 acres of upland pine plantation, and 351 linear feet of onsite stream restoration. The site was constructed to compensate for impacts associated with the US 220 Ellerbe Bypass in Richmond, specifically in the Lumber River Basin (Hydrologic Unit Code -03040203).

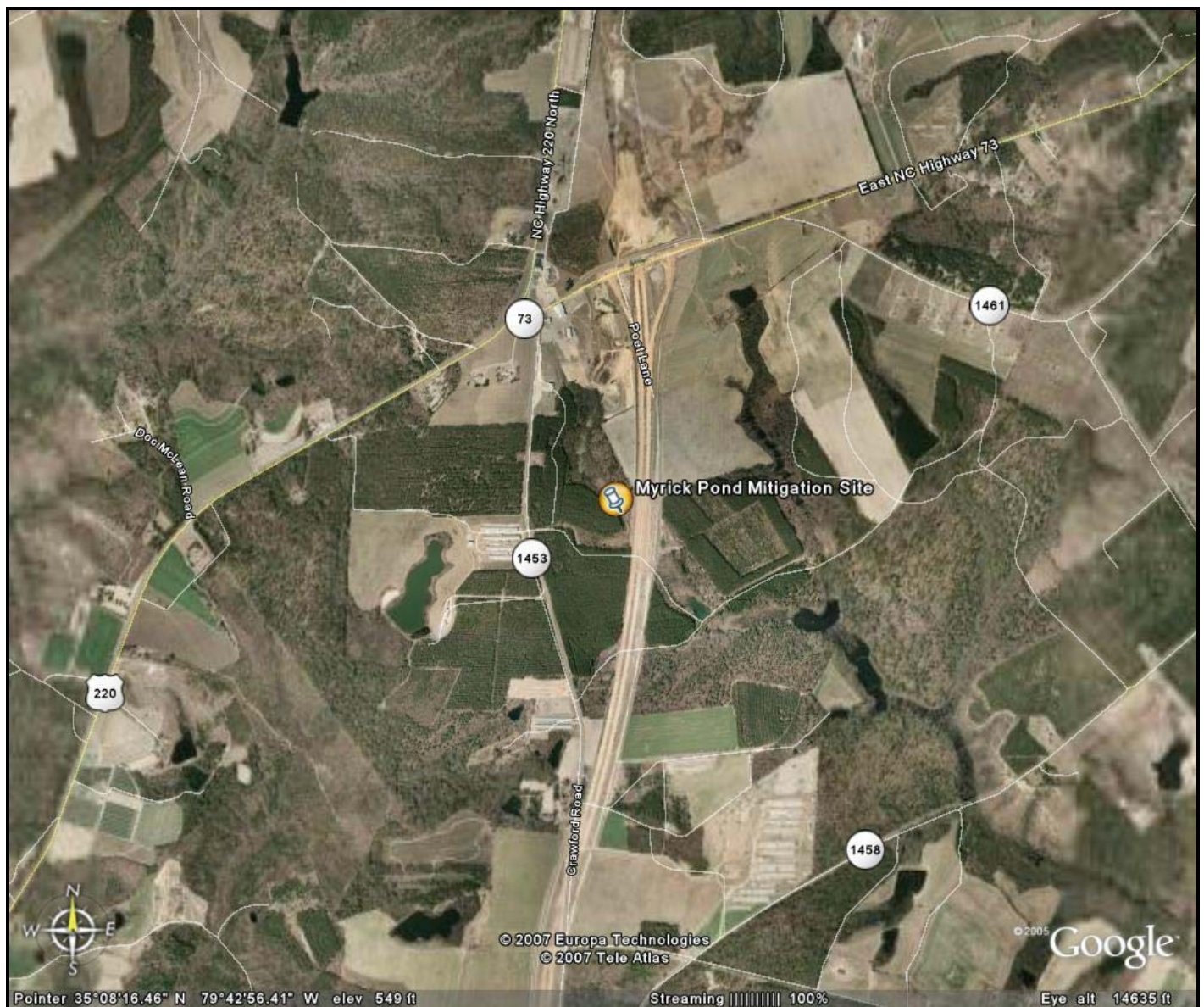
### **1.2 Purpose**

In order to demonstrate successful mitigation, hydrologic and vegetation monitoring must be conducted for a minimum of five years or until the site is deemed successful. Vegetation success criteria state that at least 320 trees/acre must survive through year three. A ten percent mortality rate will be accepted in year four (288 trees/acre) and another ten percent in year five, resulting in a required survival rate of 260 trees/acre through year five. Hydrologic success criteria are based on the approved mitigation plan, which requires that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall. This report includes analyses of hydrologic and vegetation monitoring results, discussions of local climatic conditions throughout the growing season, and site photographs.

### **1.3 Project History**

Winter 2004	Site Planted
September 2005	Stream Construction Completed
December 2006	Site Replanted
July 2007	Stream and Vegetation Monitoring (Year 1)
March-November 2007	Hydrologic Monitoring (Year 1)

Figure 1. Site Location Map



## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

The hydrologic success criteria established for Myrick Pond Mitigation Site, as stipulated in the approved mitigation plan and subsequent revisions, require that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall.

The growing season in Richmond County begins on March 25 and ends November 4. The dates correspond to a 50% probability that air temperature will drop to 28° after March 25 and before November 4<sup>1</sup>. The growing season is 227 days; therefore, optimum hydrology requires 12.5% saturation during this season, or at least 28 consecutive days.

### **2.2 Hydrologic Description**

Five groundwater monitoring gauges were installed on the site (Figure 2) in February 2007 in the emergent wetland. A rain gauge is also located on the site to assist in comparison of the rainfall data (supplied by the NC State Climate Office) from an official weather station in Carthage. The groundwater gauges record water levels on a daily basis. Monitoring data for 2007 represents the first year of hydrologic monitoring for the site.

### **2.3 Results of Hydrologic Monitoring**

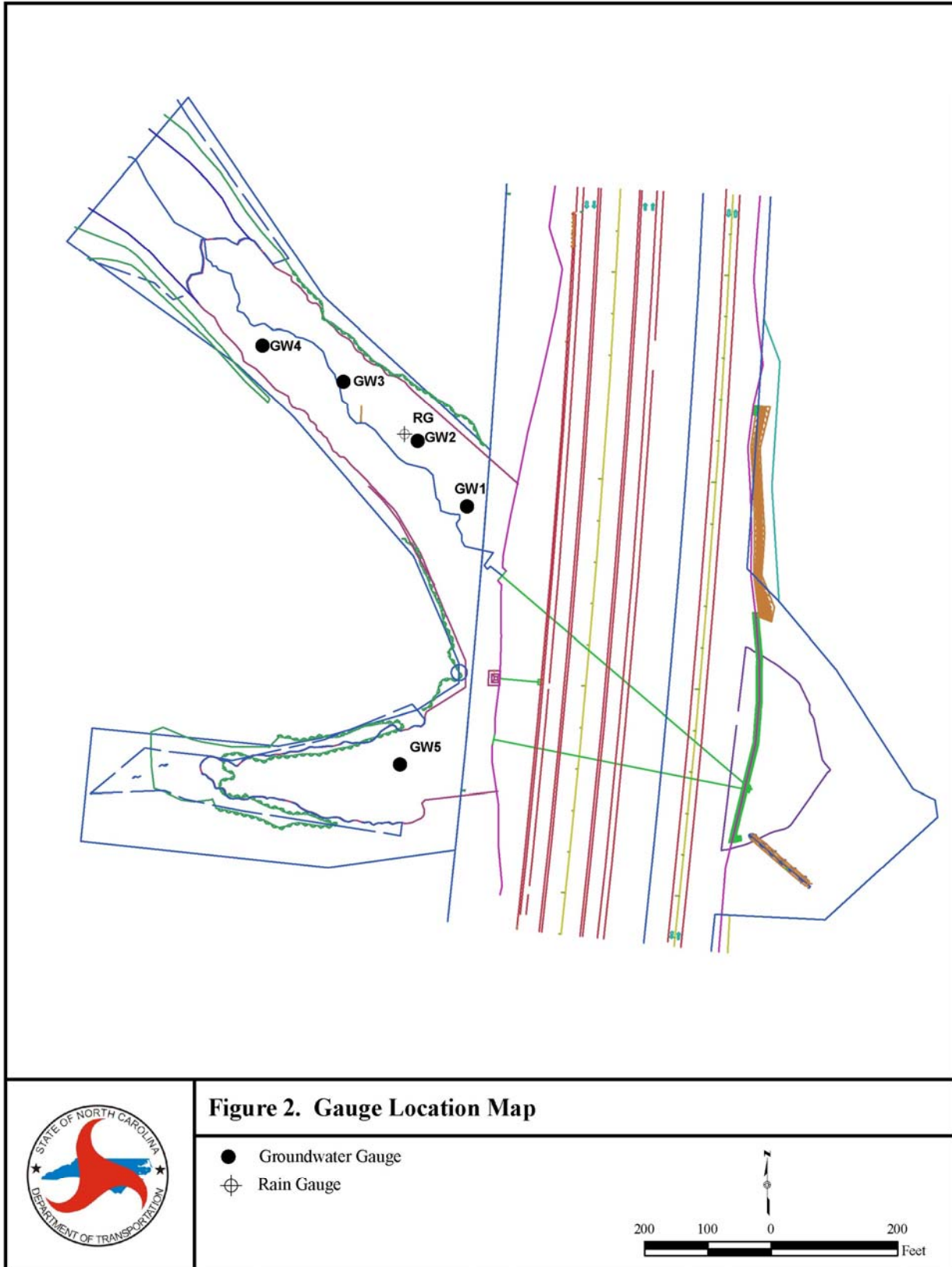
#### **2.3.1 Site Data**

The maximum number of consecutive days that saturation occurred within 12 inches of the ground surface was determined for each groundwater monitoring gauge. This number was converted into a percentage of the 227-day growing season (March 25 – November 4). Table 1 provides the 2007 hydrologic results; Figure 3 is a graphical representation of these results. Appendix A includes graphs of the data recorded at each groundwater gauge. Daily rainfall events recorded at the onsite rain gauge are included on each of the groundwater gauge plots.

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<sup>1</sup> Soil Conservation Service, Soil Survey of Richmond County, North Carolina, 1999.





**Figure 2. Monitoring Gauge Location Map**



**Table 1.** Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5-8%	8-12%	> 12.5%	Actual %	Success Dates
MPGW-1+				<b>X</b>	100	March 23-Nov 7
MPGW-2+				<b>X</b>	100	March 23-Nov 7
MPGW-3+				<b>X</b>	90.4	March 23-Oct 16
MPGW-4+				<b>X</b>	90.4	March 23-Oct 16
MPGW-5+				<b>X</b>	53.0	March 23-July 22

+Gauge met success during an average rainfall month (April, June, and September).

*Specific Gauge Problems:*

- Gauges (MPGW-3 and MPGW-4) were not accessible for download due to site being flooded by beaver dam (October 17-November 7).

### **2.3.2 Climatic Data**

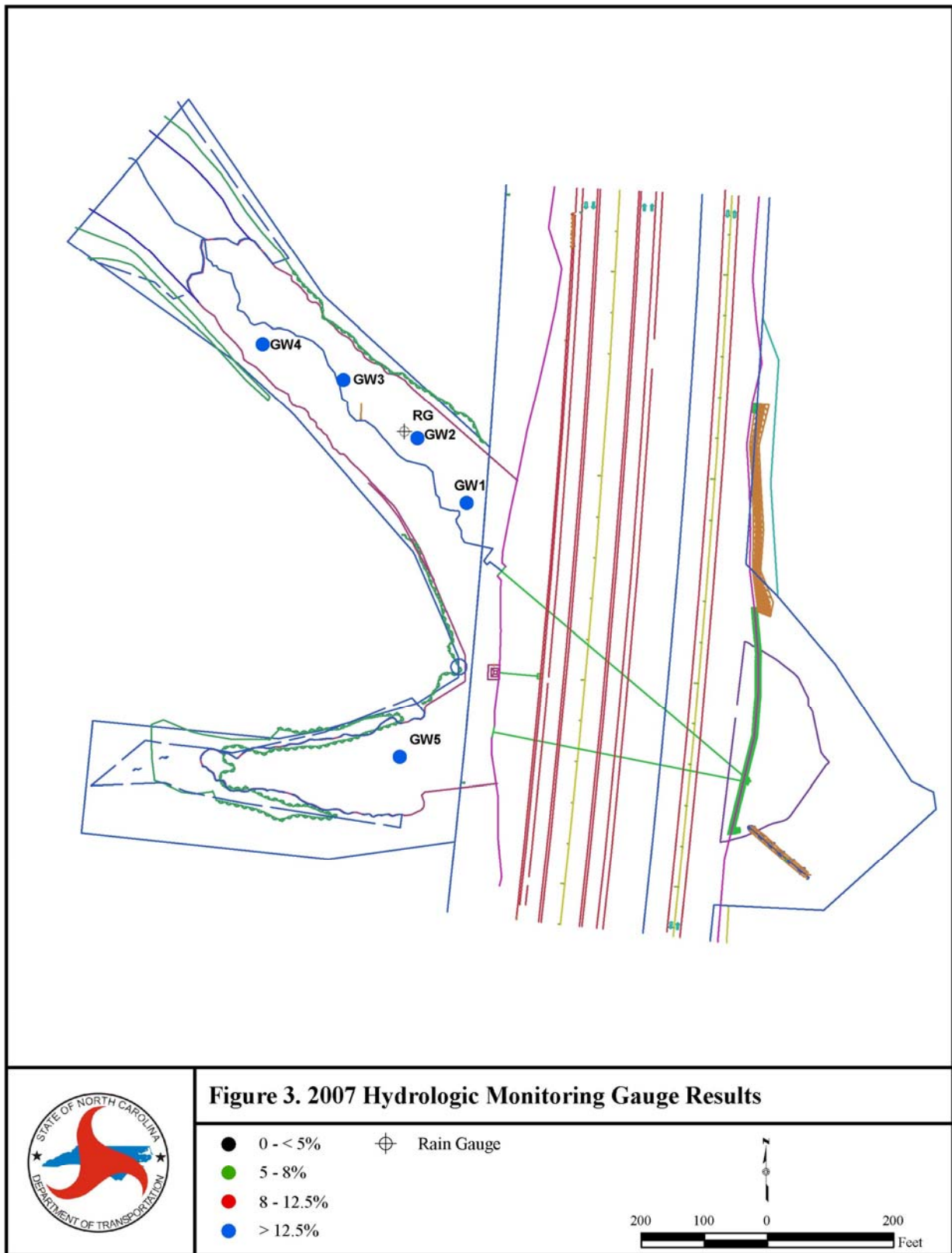
Figure 4 is a comparison of the 2007 monthly rainfall to the historical precipitation (collected between 1976 and 2007) for Carthage, North Carolina. This comparison gives an indication of how 2007 relates to historical data in terms of climatic conditions. The NC State Climate Office provided all historical rainfall information.

For 2007 year, February, March, May, July, August, October, and November recorded below average rainfall for the site. The months of April, June, and September recorded average rainfall, while January recorded above average rainfall. Due to the drought, 2007 year experienced a below average rainfall year.

## **2.4 Conclusions**

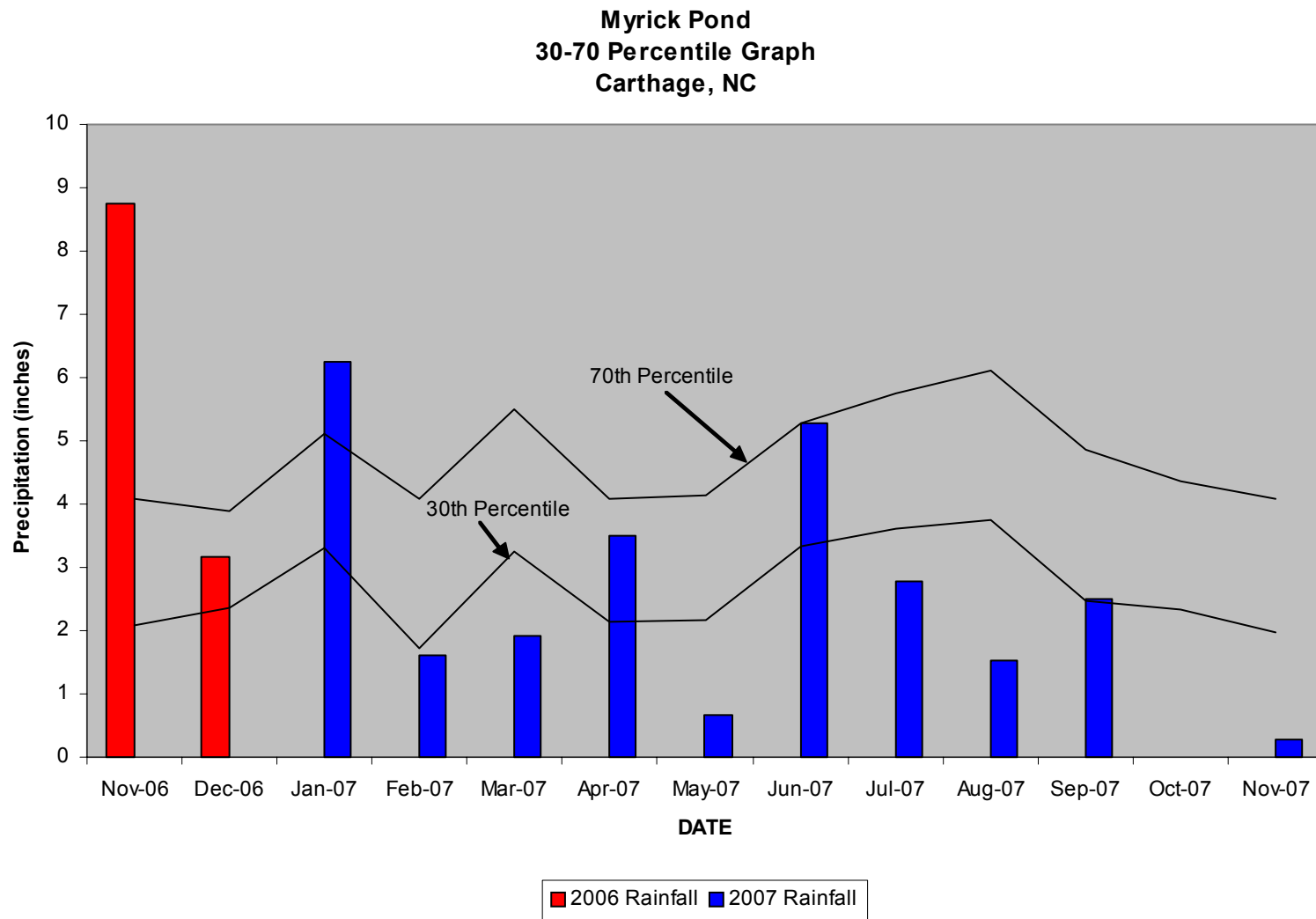
The 2007 monitoring year represents the first year of hydrologic monitoring for the Myrick Pond Mitigation Site. All five groundwater monitoring gauges recorded jurisdictional hydrology above the required 12.5% of the growing season.

NCDOT will continue to monitor the Myrick Pond Mitigation Site for hydrology.



**Figure 3.** Hydrologic Monitoring Results Map

**Figure 4. 30-70 Percentile Graph**



### **3.0 VEGETATION: MYRICK POND MITIGATION SITE (YEAR 1 MONITORING)**

#### **3.1 Success Criteria**

Success criteria have been established to verify that the wetland mitigation areas support vegetation necessary for a jurisdictional determination. Specifically for bottomland hardwood areas, a minimum mean density of 320 trees/acre is required 3 years after initial planting. The required survival criterion will decrease by 10 percent per year after the third year of vegetation monitoring (i.e., for an expected 290 stems per acre for Year 4 and 260 stems per acres for Year 5).

#### **3.2 Description of Species**

The following tree species were planted in the Wetland Restoration Area:

*Salix nigra*, Black Willow

*Cornus amomum*, Silky Dogwood

*Alnus serrulata*, Tag Alder

*Liriodendron tulipifera*, Yellow Poplar

*Platanus occidentalis*, Sycamore

*Quercus nigra*, Water Oak

*Fraxinus pennsylvanica*, Green Ash

### 3.3 Results of Vegetation Monitoring

**Table 2.** Vegetation Monitoring Results

Plot #	Black Willow	Silky Dogwood	Tag Alder	Yellow Poplar	Sycamore	Water Oak	Green Ash	Total (Year 1)	Total (at planting)	Density (Trees/Acre)
1	3		1	7	4	1	7	23	37	423
2	1			4	29			34	34	680
3	7	1		5	10	1	2	26	40	442
Average Density (Trees/Acre)										515

**Site Notes:** Other species noted: *Juncus* sp., red maple, goldenrod, cattail, tearthumb, cut grass, sedge, and various grasses. All of the vegetation plots were noted as having thick competition from herbaceous species.

### 3.4 Conclusions

There were three vegetation-monitoring plots established throughout the 2.45 acre planting area. The 2007 vegetation monitoring of the site revealed an average tree density of 515 trees per acre, which is well above the minimum success criteria of 320 trees per acre. NCDOT will continue to monitor vegetation at the Myrick Pond Mitigation Site.

## 4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The 2007 monitoring year represents the first year of hydrologic monitoring for the Myrick Pond Mitigation Site. All five groundwater monitoring gauges recorded jurisdictional hydrology above the required 12.5% of the growing season.

Vegetation monitoring yielded 515 trees per acre. This average is well above the minimum success criteria of 320 trees per acre.

NCDOT will continue to monitor the Myrick Pond Mitigation Site for vegetation and hydrology.

## **APPENDIX A**

### **GAUGE DATA GRAPHS**

## **APPENDIX B**

### **PHOTO AND VEGETATION PLOT LOCATIONS, SITE PHOTOS**



# Myrick Pond



Photo Point #1 (Upstream)



Photo Point #1 (Downstream)



Photo Point #2 (Upstream)



Photo Point #2 (Downstream)



Photo Point #3 (Upstream)



Photo Point #3 (Downstream)

July 2007



# Myrick Pond



Photo Point #4 (Upstream)



Photo Point #3 (Downstream)



Photo Point #5 (Upstream)



Photo Point #5 (Downstream)



Photo Point #6 (Looking Towards Vegetation Plot 1)



Photo Point #6 (Looking Towards Vegetation Plot 2)

July 2007



## Myrick Pond



Photo Point #7 (Looking Downstream at the Outlet End of the Box Culvert)

July 2007

# MYRICK POND MITIGATION SITE

